

REMARKS

The Final Office Action mailed March 21, 2007 has been received and reviewed. Claims 1, 5 through 8, and 11 through 21 are currently pending in the application. Claims 1, 5 through 8, and 11 stand rejected. Claims 12 through 21 are allowed. Applicants propose to amend claim 1. No new matter is added. Reconsideration is and respectfully requested.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,190,911 to Gofuku in view of U.S. Patent No. 3,451,871 to Bauer et al.

Claims 1, 6, and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gofuku (U.S. Patent No. 6,190,911), in view of Bauer et al. (U.S. Patent No. 3,451,871), hereinafter "Bauer." Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Gofuku discloses a method of fabricating a semiconductor device that includes depositing an insulating film and etching an opening therein. (Gofuku, col. 5, lines 58-62). The opening exposes a portion of a contact region in an N-type blocking layer. Wiring electrodes, formed from AlSi, are formed in the opening. (*Id.* at column 5, line 63 through column 6, line 3).

Bauer discloses a method of treating metal surfaces to improve adherence of a cover layer thereto. For example, Bauer teaches treating aluminum layers with a high voltage. (Bauer, col. 12, lines 39-47).

Claim 1 of the presently claimed invention recites "A method for forming a contact electrically connected to a metal line, comprising: forming an insulation layer situated on a

semiconductor substrate; forming a contact hole in the insulation layer to expose a contact surface on the semiconductor substrate; forming a refractory metal nitride layer upon a sidewall of the contact hole; and forming a single layer of metal having a substantially planar top surface upon a top planar surface of the insulation layer, the single layer of metal substantially filling the contact hole and in physical contact with the contact surface on the semiconductor substrate, wherein the single layer of metal comprises a material selected from the group consisting of AlAg, AlAu, AlMn, AlNa, AlW, AlCuZn, and AlNi.” Support for the amendment may be found throughout the as-filed specification including, for example, paragraphs [0026] and [0050].

Gofuku and Bauer fail to teach or suggest each and every element of amended claim 1 because Gofuku and Bauer do not teach or suggest the element of “forming a refractory metal nitride layer upon a sidewall of the contact hole.” As the proposed combination of references fails to teach or suggest every element of the presently claimed invention, Gofuku and Bauer cannot render claim 1 obvious.

Claims 6 and 11 are allowable, *inter alia*, as depending from an allowable base claim.

Obviousness Rejection Based on U.S. Patent No. 5,960,304 to McAnally et al. in view of Bauer

Claims 1, 5, and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over McAnally et al. (U.S. Patent No. 5,960,304), hereinafter “McAnally,” in view of Bauer. Applicants respectfully traverse this rejection, as hereinafter set forth.

McAnally discloses a method of forming a contact to a substrate. McAnally at column 2, lines 43-45. A first stopping layer, an insulating layer, and a second stopping layer are formed over the substrate and are etched to form the contact. *Id.* at column 2, line 52 through column 3, line 67. The contact is filled with a conductive material. *Id.* at column 4, lines 15-17. The discussion of Bauer is incorporated herein.

Claim 1 of the presently claimed invention recites “A method for forming a contact electrically connected to a metal line, comprising: forming an insulation layer situated on a semiconductor substrate; forming a contact hole in the insulation layer to expose a contact surface on the semiconductor substrate; forming a refractory metal nitride layer upon a sidewall of the contact hole; and forming a single layer of metal having a substantially planar top surface

upon a top planar surface of the insulation layer, the single layer of metal substantially filling the contact hole and in physical contact with the contact surface on the semiconductor substrate, wherein the single layer of metal comprises a material selected from the group consisting of AlAg, AlAu, AlMn, AlNa, AlW, AlCuZn, and AlNi.” Support for the amendment may be found throughout the as-filed specification including, for example, paragraphs [0026] and [0050].

McNally and Bauer fail to teach or suggest each and every element of amended claim 1 because McNally and Bauer do not teach or suggest the element of “forming a refractory metal nitride layer upon a sidewall of the contact hole.” As the proposed combination of references fails to teach or suggest every element of the presently claimed invention, McNally and Bauer cannot render claim 1 obvious.

Claims 5 and 6 are allowable, *inter alia*, as depending from an allowable base claim.

Obviousness Rejection Based on Gofuku in view of Bauer, and in further view of U.S. Patent No. 5,355,020 to Lee et al. and U.S. Patent No. 5,840,623 to Sahota

Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gofuku in view of Bauer, and in further view of Lee et al. (U.S. Patent No. 5,355,020), hereinafter “Lee,” and Sahota (U.S. Patent No. 5,840,623). Applicants respectfully traverse this rejection, as hereinafter set forth.

Dependent claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gofuku in view of U.S. Patent No. 5,355,020 to Lee *et al.* (“Lee”) and U.S. Patent No. 5,840,623 to Sahota (“Sahota”). Applicants respectfully traverse this rejection, as hereinafter set forth. Since claims 7 and 8 are dependent claims, these claims are allowable, *inter alia*, as depending from an allowable base claim

ENTRY OF AMENDMENTS

The proposed amendments to claim 1 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search. Finally, if the Examiner determines that the amendments do not place the application in condition for allowance, entry is respectfully requested upon filing of a Notice of Appeal herein.

CONCLUSION

Claims 1, 5 through 8, and 11 through 21 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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